

so amended the claims, and believe that they are now in condition for allowance.

The Applicants are grateful to the Examiner for favorable action on the claims reciting an internal reference target or movable sensor hood.

Section 112 rejections

In the Official Action it is suggested that claims 50 and 51 are not supported in the application as filed. It is said in the original specification, however (page 35, lines 27 through 31; emphasis added) —

"This auxiliary carriage can have very loose requirements. . . . Its positioning accuracy need be only sufficient to position the sensor over a relatively large test patch."

Objectively, the size of a typical test patch varies from some 25 mm (one inch) square, at the time of filing this application, down to roughly 5 mm (1/5 inch) square currently. As suggested in an earlier amendment, positioning a sensor over a test patch typically calls for centering the sensor to roughly a tenth of the patch dimension.

This comes to a value between $25/10 = 2\frac{1}{2}$ mm and $5/10 = \frac{1}{2}$ mm, as claimed. In an effort to more precisely comply with the Examiner's instructions, however, the claims have now been couched in terms of a single-ended range. Applicants therefore again request allowance of these very narrow claims.

As may be recalled, Applicants filed these two claims in response to rejection of the more generally couched claims 8 and 14. That rejection in turn rested on the argument that a printhead auxiliary carriage in the Hirano inkjet-printing patent could be combined with the Beauchamp and Vincent test-

pattern-reading patents to render obvious Applicants' original colorimeter auxiliary carriage.

Hence, although none of the references really teaches the Applicants' remarkable advancement in cost-effective color calibration, the Applicants have now been denied even narrow claims reciting a practical, common-sense numerical indication of the loose requirements pertinent to operation. That numerical indication is based clearly upon the original specification and facts well known in this field.

The Applicants respectfully submit that this result is unduly harsh. In event the foregoing explanation of basis for the claims is not deemed persuasive, the Applicants respectfully ask the Examiner to advise what wording, if any, he would regard as acceptable for claiming this feature.

Section 103 rejections

(a) Minor informalities — The Applicants respectfully point out that in September of last year the Examiner wrote:

"Claims 8 and 14 are objected to because of minor informalities:

"In claims 8 and 14, the phrases 'low velocity' and 'low positioning accuracy' are relative terms and may not be clear. It is suggested that applicant claim that the velocity and positioning accuracy is less than a certain amount."

Since receiving that advice, the undersigned has earnestly tried to comply — including maintenance of dependent claims

50 and 51 reciting numerical values. The accompanying amendments represent yet another attempt.

The value 3 cm/sec (roughly 1 ips) now recited in claims 8 and 14 simply represents approximately one-tenth of a conventional inkjet-printer scan speed. A typical value of that speed, 33 cm/sec (13 $\frac{1}{3}$ ips) appears e. g. in Beauchamp at column 8, lines 59 through 62.

Applicants again sincerely ask that the Examiner either approve the claims as amended here, or suggest other wording regarded as acceptable.

(b) Stationary-operation claims — As to Applicants' claims, including claim 1, that recite stationary operation, it is argued in the Official Action that (emphasis added):

"such an operation is believed to be inherent and therefore necessary in Beauchamp and Vincent, since they would have to move the sensor to a measurement position, then take a measurement while the sensors are stationary and then move the sensor to the next position."

Applicants respectfully traverse. Why do Beauchamp and Vincent "have to" make their measurements while their systems are stationary?

It would appear that Beauchamp and Vincent can take measurements while their sensors are moving — i. e. while the sensors and media are in relative motion.

New claim 52

To the extent that the recitation of stationary measurement has not been accorded patentable weight, it appears that


the indicated allowability of claim 9 does not rely upon that portion of its parent claim 1. That recitation is omitted from new claim 52, which otherwise is the same as claim 9. If this reasoning is correct, then the new claim is in condition for allowance.

Conclusion

In view of the foregoing amendments and remarks, Applicants respectfully request the Examiner's favorable reconsideration and allowance of all the claims now standing in this case.

It is respectfully requested that, should there appear any further obstacle to allowance of the claims herein, the Examiner telephone the undersigned attorney to try to resolve the obstacle.

Respectfully submitted,



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MARKED-UP COPIES OF THE AMENDED AND NEW CLAIMS

For the Examiner's convenience all the claims, including new claim 52, have been placed in the claim sequence at the points where desired — in particular, with claim 52 after claim 50. Two previously added claims, 50 and 51, follow claims 8 and 14 respectively.

1 8. (twice amended) An incremental printer for forming
2 desired images on a printing medium, by construction from
3 individual marks in arrays; said printer comprising:
4 at least one colorant-placing module for marking on
5 such medium;
6 a first sensor, mounted to said carriage, for determin-
7 ing condition or relative positioning of the at least one
8 colorant-placing module;
9 a second sensor for making color measurements of mark
10 arrays formed on such medium by the at least one module;
11 and
12 a mechanism for advancing the second sensor into a
13 measurement position at only low velocity and only low po-
14 sitioning accuracy needed for roughly centering the second
15 sensor over successive colorimetric test-pattern patches in
16 turn;
17 wherein said low velocity is on the order of 3 cm (1
18 inch) per second, or less; and said low accuracy is on the
19 order of 1/10 the dimension of an individual mark, or
20 coarser.

1 50. (amended) the printer of claim 8, wherein:
2 the low positioning accuracy is on the order of 0.5 [to
3 2.5] mm (1/50 [to 1/10] inch), or coarser.

1 52. (new; to follow claim 50) An incremental printer for
2 forming desired images on a printing medium, by construc-
3 tion from individual marks in arrays; said printer
4 comprising:
5 at least one colorant-placing module for marking on
6 such medium;
7 a colorant carriage for holding and moving the modules
8 over such medium;
9 a motor and drive train for propelling said carriage
10 over such medium;
11 a first sensor, mounted to said carriage, for determin-
12 ing condition or relative positioning of the at least one
13 colorant-placing module;
14 a second sensor for making color measurements of mark
15 arrays formed on such medium by the at least one module;
16 an auxiliary carriage for holding and moving the second
17 sensor over such medium; said auxiliary carriage being
18 selectively attachable to and detachable from the colorant
19 carriage, but having substantially no drive train other
20 than that of the colorant-carriage drive train; and
21 a mechanism for advancing a component associated with
22 the second sensor into contact with such medium.

1 9. (amended) An [The] incremental printer for forming
2 desired images on a printing medium, by construction from
3 individual marks in arrays; said printer comprising:
4 at least one colorant-placing module for marking on
5 such medium;
6 a colorant carriage for holding and moving the modules
7 over such medium;
8 a motor and drive train for propelling said carriage
9 over such medium;
10 a first sensor, mounted to said carriage, for determin-
11 ing condition or relative positioning of the at least one
12 colorant-placing module;
13 a second sensor for making color measurements of mark
14 arrays formed on such medium by the at least one module;
15 an auxiliary carriage for holding and moving the second
16 sensor over such medium; said auxiliary carriage being
17 selectively attachable to and detachable from the colorant
18 carriage, but having substantially no drive train other
19 than that of the colorant-carriage drive train;
20 means for controlling the motor and drive train, while
21 the carriages are attached, to position the colorant car-
22 riage and thereby the auxiliary carriage for substantially
23 stationary measurement of such a mark array on such medium;
24 and [of claim 1, further comprising:]
25 a mechanism for advancing a component associated with
26 the second sensor into contact with such medium.

1 14. (twice amended) An incremental printer for forming
2 desired images on a printing medium, by construction from
3 individual marks in arrays; said printer comprising:
4 at least one colorant-placing module for marking on
5 such medium;
6 a first carriage for holding and moving the colorant-
7 placing module over such medium; and
8 a second carriage, discrete from the first carriage,
9 for use in refining the quality of images produced by the
10 printer;
11 wherein the second carriage scans a sensor over such
12 medium at only low velocity and only low positioning accu-
13 racy needed for roughly centering the second sensor over
14 successive colorimetric test-pattern patches in turn; and
15 said low velocity is on the order of 3 cm (1 inch) per
16 second, or less; and said low accuracy is on the order of
17 1/10 the dimension of an individual mark, or coarser.

1 51. (amended) The printer of claim 14, wherein:
2 the low positioning accuracy is on the order of 0.5 [to
3 2.5] mm (1/50 [to 1/10] inch), or coarser.

1 15. (amended) An [The] incremental printer for forming
2 desired images on a printing medium, by construction from
3 individual marks in arrays; said printer comprising:
4 at least one colorant-placing module for marking on
5 such medium;
6 a first carriage for holding and moving the colorant-
7 placing module over such medium; and
8 a second carriage, discrete from the first carriage,
9 for use in refining the quality of images produced by the
10 printer;
11 wherein the second carriage scans a sensor over such
12 medium at only low velocity and only low positioning accu-
13 racy needed for roughly centering the second sensor over
14 successive colorimetric test-pattern patches in turn; [of
15 claim 14,] wherein:
16 the sensor is a sensor for making color measurements of
17 marks formed on such medium by the at least one colorant-
18 placing module; and
19 the second carriage also holds at least one reference
20 target for presentation to the sensor.

1 17. (amended) An [The] incremental printer for forming
2 desired images on a printing medium, by construction from
3 individual marks in arrays; said printer comprising:
4 at least one colorant-placing module for marking on
5 such medium;
6 a first carriage for holding and moving the colorant-
7 placing module over such medium; and
8 a second carriage, discrete from the first carriage,
9 for use in refining the quality of images produced by the
10 printer;
11 wherein the second carriage scans a sensor over such
12 medium at only low velocity and only low positioning accu-
13 racy needed for roughly centering the second sensor over
14 successive colorimetric test-pattern patches in turn; [of
15 claim 14,] further comprising:
16 a hood generally surrounding the sensor laterally with
17 respect to a sensing direction; and
18 a mechanism for advancing the hood along the sensing
19 direction toward such medium.

1 18. (amended) An [The] incremental printer for forming
2 desired images on a printing medium, by construction from
3 individual marks in arrays; said printer comprising:
4 at least one colorant-placing module for marking on
5 such medium;
6 a first carriage for holding and moving the colorant-
7 placing module over such medium; and
8 a second carriage, discrete from the first carriage,
9 for use in refining the quality of images produced by the
10 printer;
11 wherein the second carriage scans a sensor over such
12 medium at only low velocity and only low positioning accu-
13 racy needed for roughly centering the second sensor over
14 successive colorimetric test-pattern patches in turn; [of
15 claim 14,] further comprising:
16 a mechanism for advancing a component associated with
17 the sensor into contact with such medium.

[end of amendment]